SEMESTER EXAMINATION DECEMBER-2023

Course Name: - B.Tech. (CSE) **Semester:- III**

Paper Name: - Digital Electronics **Paper Code:- TES301**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं साह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न **तीन अंक** का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The hexadecimal number $(C3B1)_{16}$ is equivalent to _____

a) $(12197)_{10}$

b) $(32097)_{10}$

c) $(52097)_{10}$

d) $(50097)_{10}$

ii) Race Around condition occur in .....

a) Level Triggered R-S Flip Flop

b) Level Triggered J-K Flip Flop

c) Edge Triggered R-S Flip Flop

d) Edge Triggered J-K Flip Flop

iii) Which of the following options represent the correct reduction of

$$X\bar{Y}Z + \bar{X}\bar{Y}Z$$

a) 0

b) $\bar{X}Z + \bar{Y}Z$

c) $X + \bar{Y}$

d) $X\bar{Y}$

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iv) ECL is a type of logic family - .....

a) Saturated Bipolar Logic Family

b) Saturated Unipolar Logic Family

c) Non Saturated Bipolar Logic Family

d) Non Saturated Unipolar Logic Family

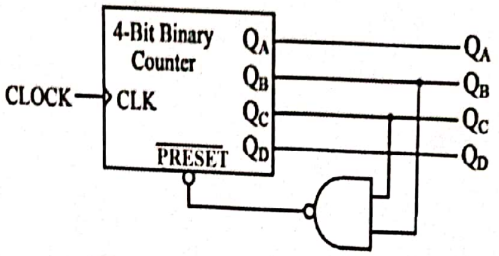
v) A synchronous binary up-counter with synchronous preset input is shown in the figure where Q_A is MSB bit and Q_D is LSB bit. The sequence of counter is

a) 0-1-2-3-4-5-0

b) 0-1-2-3-4-5-6-0

c) 0-1-2-3-4-5-15

d) 0-1-2-3-4-5-6-15-0



Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. 5x7=35
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i) What are the digital logic families? Explain its characteristics and importance?

ii) What is difference between combinational and sequential circuit? Implement Full adder and full subtractor logic function using "3:8 decoder".

iii) What is a Quine-McCluskey method? Obtain the minimal expression using Quine-McCluskey method.

$$F(A,B,C,D) = \Sigma m(0,1,2,3,5,7,8,9,11,14)$$

iv) What is Multiplexer? Implement the following boolean function using only one 8:1 multiplexer.

$$Y(A,B,C,D) = \Sigma m(0, 2, 4, 7, 11, 13, 15)$$

v) What is importance of analog-to-digital (A/D) and digital-to-analog (D/A) converters in modern electronic systems. Explain Binary weighted digital-to-analog (D/A) converter.

vi) Explain the concept of complements in digital logic. Solve the (-22)10 – (17)10 by 1's and 2's complement.

vii) Using K – map, obtain the minimal SOP expressions of the following and design output of K-Map by NOR gates.

$$F(A,B,C,D) = \sum m(1,3,4,5,7,9,11,13,14) + D(0,6,12,15)$$

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Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) What is memory and memory organization? Write the different operation of memory organization.

ii) What is shift register? Design and Explain Bidirectional shift register.

iii) Compare synchronous and asynchronous sequential circuits. Design a synchronous sequential circuit for the specified sequence. The sequence is:

3-6-2-7-0-5-1-3-6-2.....

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